Possibilities for Radical Decrease of GHG Emissions

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Can a Digital Disruption in shipping lead to radical decrease in GHG emissions?

At NAPA
we help to improve the Technical and Operational performance of safe ships

Technical Performance

- Focusing on technical capabilities of the ship:
  - Hull form and propulsion machinery
  - Energy saving devices and equipment
  - Maintenance of the ship
- Affects the fuel consumption and GHG emissions over the life cycle of the ship
- Double digit reduction in GHG emissions and fuel consumption is reality

20 % REDUCTION OF CONSUMPTION WHEN OPTIMIZED FOR REAL OPERATIONAL PROFILE

Reference:

DESIGN OPTIMIZATION FOR OPERATIONAL PROFILE – WHAT CAN BE ACHIEVED FOR BULKY HULLS?

J Henrichs & al, *Energy Efficient Ships, 4th November 2015, Rotterdam, The Netherlands*

A 7 % Case for a modern bulk carrier

- Longitudinal study of operational profile of modern bulk carrier
- Very modern an technically high performing design
- **Most of the time the ship operates very far from the design point!**
- **7 %** ”too high” GHG emissions over the entire **lifecycle**

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8,00				0,3 %	0,8 %		0,3 %
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10,00				1,0 %	2,9 %	1,1 %	2,6 %
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12,00	1,8 %	0,5 %	1,3 %	5,7 %	2,6 %	0,8 %	10,2 %
13,00	3,6 %	1,8 %	2,1 %	5,2 %	2,3 %		5,5 %
14,00	0,5 %	0,8 %		6,1 %			1,1 %
15,00	0,5 %	0,3 %		0,6 %			0,3 %

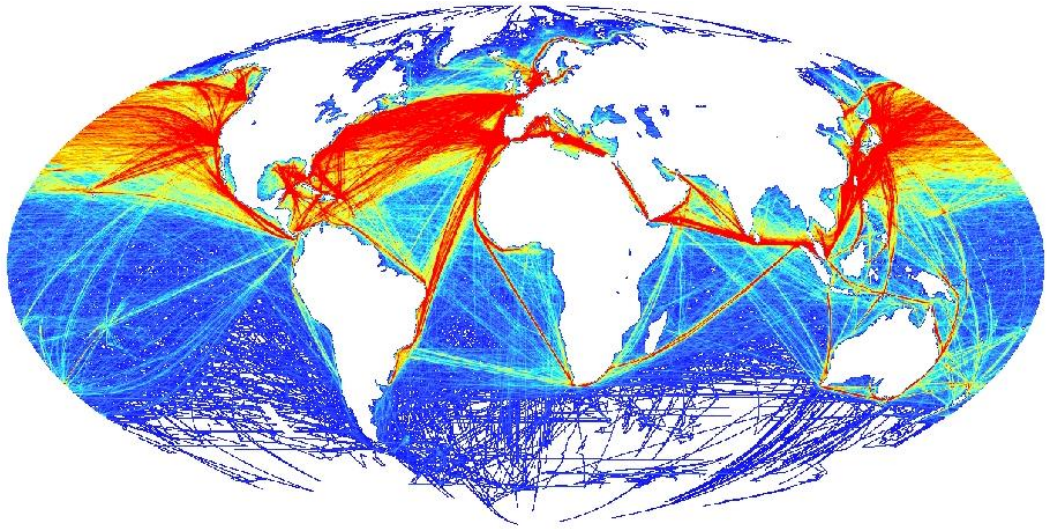
Design Point

Reference: YOSHIDA, KOIKE, KUUTTI, FURUSTAM, *Improving Ship Designs by Analysis of Ship Operation*, International Conference on Computer Applications in Shipbuilding, 2015

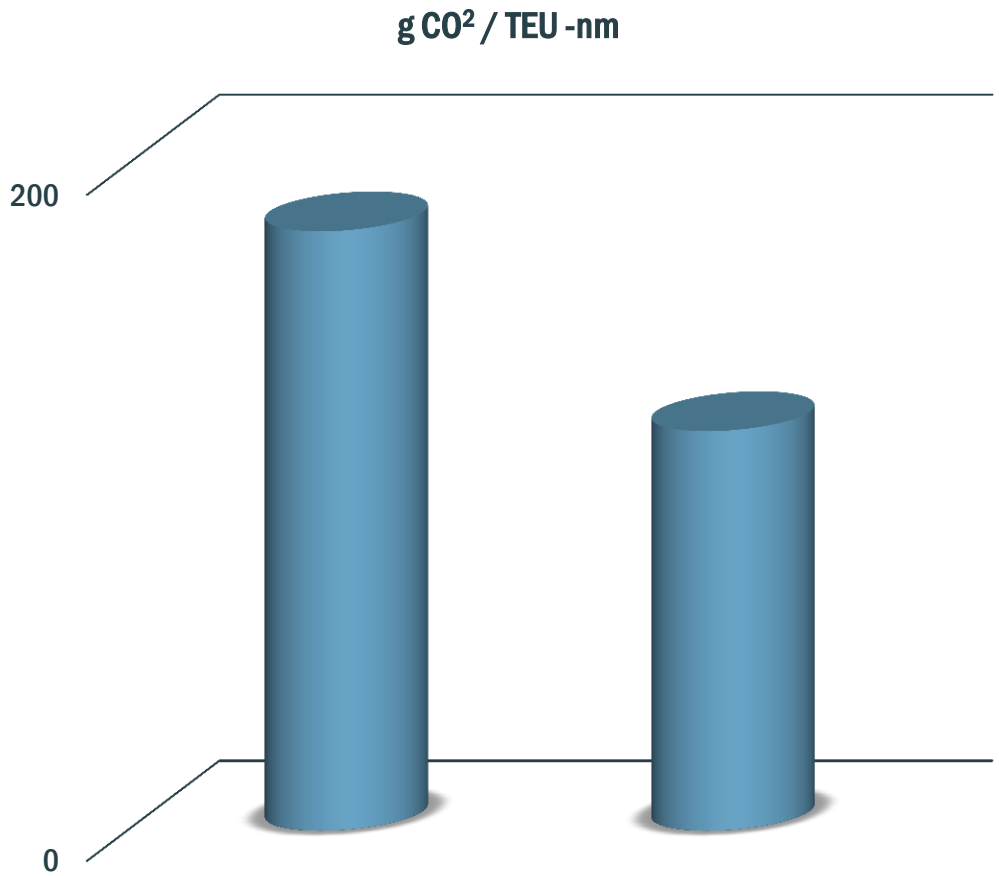
Deep and early co-operation unlocks this potential

Operational Performance

- Defined as operational performance of the shipping company
  - Utilization of cargo capacity
  - Scheduling of ship
  - Routing of ship
  - **Voyage Execution**
- **Affects the fuel consumption of a individual ships voyage**
- Double digit reduction in GHG emissions and fuel consumption is reality (emissions / transported cargo)



Big differences in performance indicates big potential

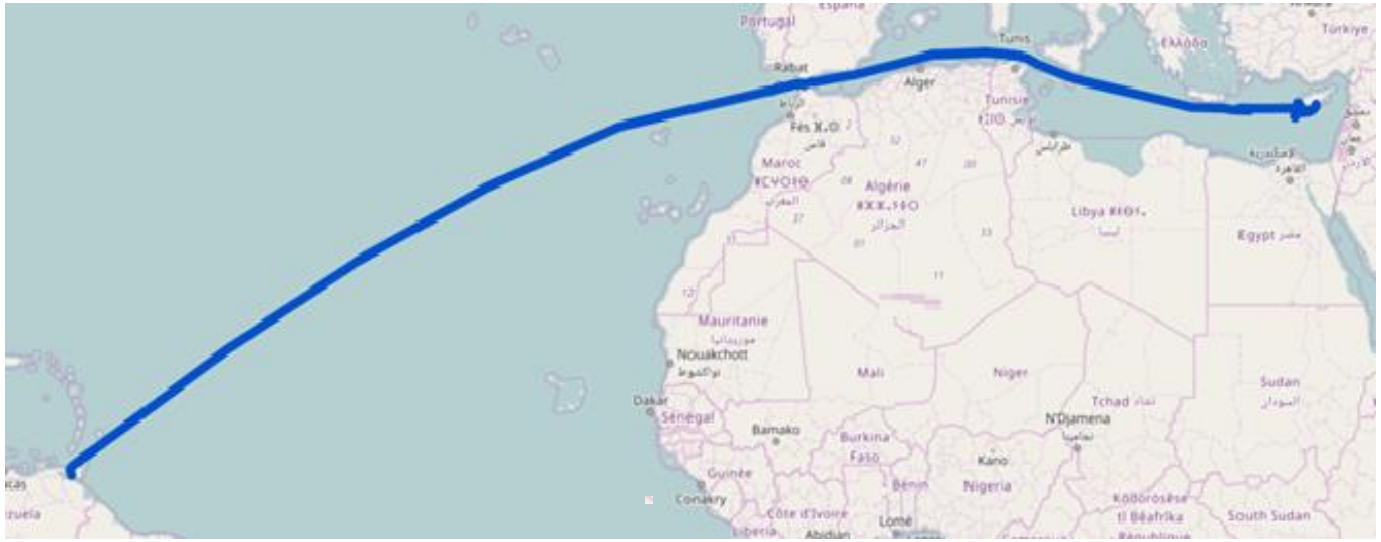


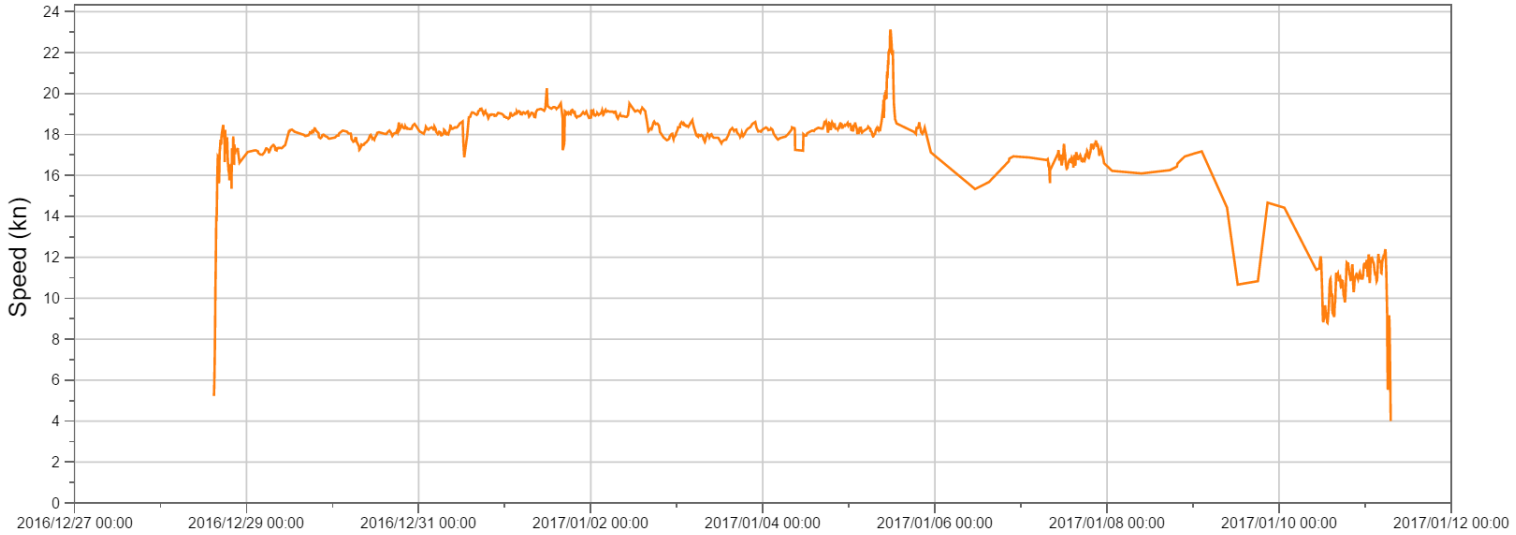
- Ships with same level of Technical performance show **huge differences in Operational Performance**
- Up to one third of the emissions of a bottom performer is due to his level of Operational Performance

Reference: Haifeng Wang and Nic Lutsey , *Long-term potential for increased shipping efficiency through the adoption of industry-Leading practices*, 2013

What if even the best can still improve?
How much?

Example Voyage - not a bottom performer

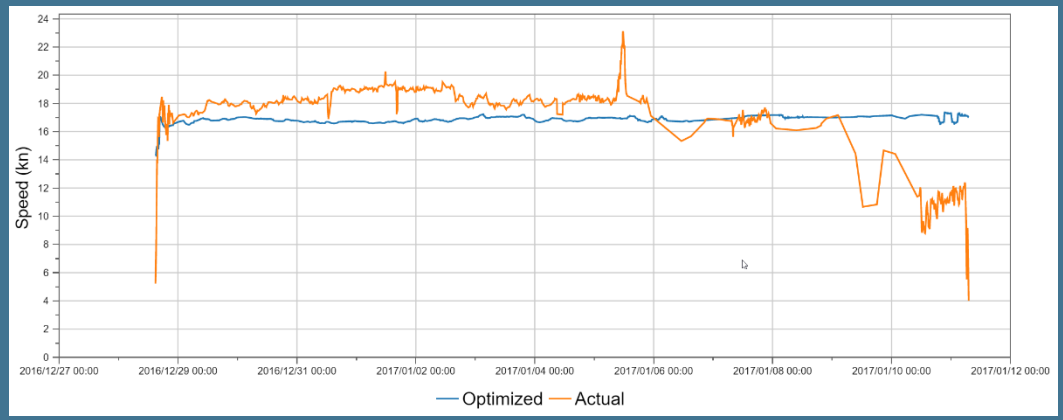




10% off from Optimal

- The voyage was optimized retrospectively by:
  - Creating a detailed model of the ship
  - The speed along the route was optimized
- Taking into account:
  - Wind, waves and currents
  - Loading of ship
  - Water depths

Optimized speed based on real conditions



Route was not analyzed

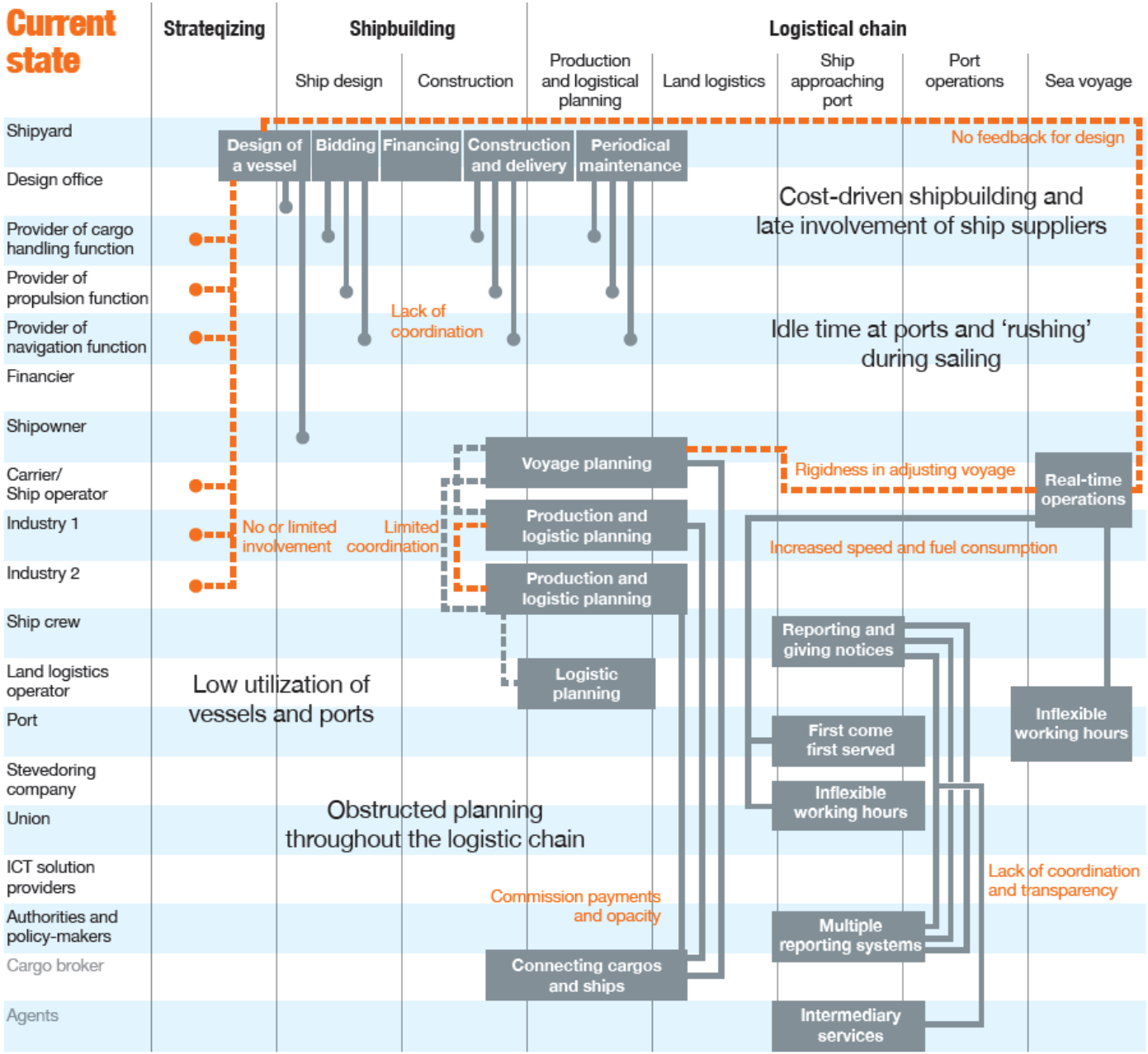
Why is the value chain this inefficient?

Inefficient Ecosystem

The current state of Marine and Shipping Ecosystem is very

- complex
- fragmented
- has parties with conflicting interest
- hides inefficiencies

Reference: Positioning Report
Analysis of the current marine industry structure and a vision for a renewed marine industry ecosystem
Åbo Akademi University 2015 – REBUS Program



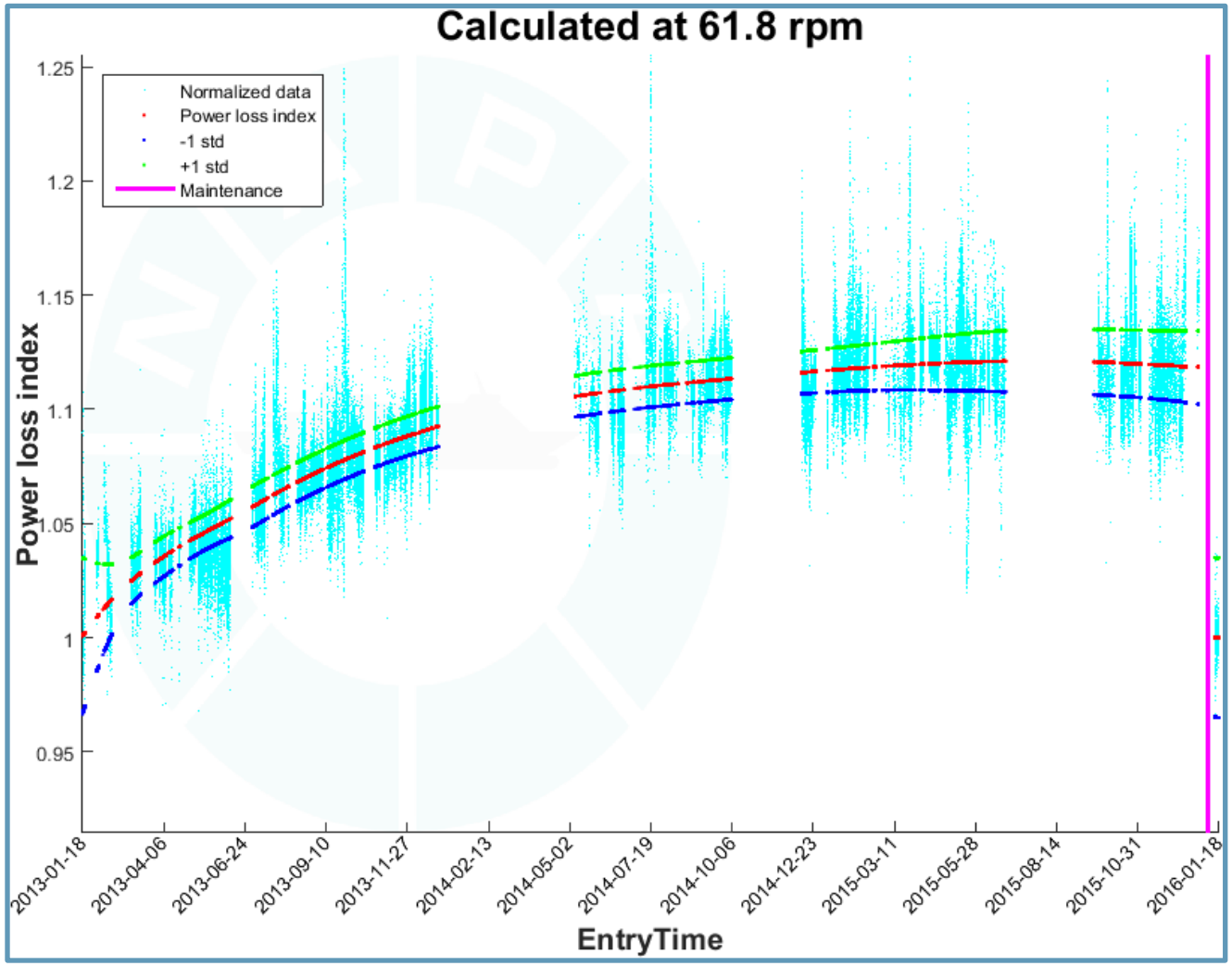
Example: Excess 42 000 tons of CO2 and 7 000 000 USD

Ship owner:

- Pays for hull maintenance
- Pays performance penalty

Cargo owner:

- Pays for fuel
- Does not have access to accurate analysis



The possibilities are there, if we are ready to change

- Most of that data is still proprietary and confidential
- Open data is increasing all the time for the benefit of the whole value chain and our climate
- Inertia of the maritime ecosystem is huge. It will change gradually or in one burst by a outsider

Global VLCC Fleet since December 1st 2016

Summary

- Monumental possibilities for increased efficiency and decrease of GHG emissions exists
- Scattered reporting and paper-based logs still mainstream
- Conflict of interest and sub optimization increases inertia in the ecosystem
- IT and Data enablers for Efficiency in Shipping Value Chain
- **Open and transparent information will be the game changer (bringing shipping closer to *a Perfect Market*)!**

It is not IF,
but HOW and WHEN
we will have the
BIG CHANGE